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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Improvements in or relating to Gas Turbine Plants.

We, HEINZ TEVES, ERNST AUGUST TEVES and MARTIN TAUSEND, all of German Nationality, trading as ALFRED TEVES MASCHINEN-UND ARMATURENFABRIK KOMMANDIT-GESELLSCHAFT, of Rebstocker Strasse 41–53, Frankfurt/Main, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a gas turbine plant of the intermittent combustion type in which a combustible gas is produced from a liquid fuel.

In known gas turbine plants of this type the fuel in the form of a combustible gas and in admixture with air is sucked into a combustion chamber through aerodynamic valves. Intermittent combustion takes place, the suction being provided by that which follows every wave of a pulsating detonation. This suction causes the air and fuel to become mixed in the combustion chamber, then ignited and burned therein by the next detonation wave. The burnt gas leaves the combustion chamber to turn its energy into work in the gas turbine.

As it is required to supply the fuel to the combustion chamber in a pressurised state, a compressor has to be provided. This increases the complexity of the apparatus with a resultant considerable increase in costs and a decrease in efficiency.

It is an object of the present invention to provide a gas turbine plant of the intermittent combustion type in which a combustible gas is provided from a liquid fuel, which plant dispenses with a compressor for the fuel.

According to the present invention there is provided a gas turbine plant of the intermittent combustion type in which a combustible gas is produced from a liquid fuel, said plant comprising a gas turbine, an intermittent combustion chamber preceding said turbine and in which the combustible gas and oxygen are burnt, a first pressure vessel preceding said combustion chamber for containing fuel and means for conveying exhaust gas of the turbine to the first pressure vessel so as to be in heat exchange relation with the fuel in the first pressure vessel thereby to convert any fuel in liquid form to the combustible gas and to pressurise the combustible gas to a high pressure.

It is known to use waste gas heat in thermal power plants but for purposes other than that in which waste gases are used in the gas turbine plant of the invention. For example, in an internal combustion engine for a heavy appliance, it is known to pre-heat the fuel by the waste gases in order to reduce the viscosity of the fuel. Such preheating also improves the thermal efficiency of the engine.

The invention is also applicable to gas turbine plants in which means are provided for feeding an oxidiser to the combustion chamber with the fuel and oxygen. The oxidiser feeding means may include a second pressure vessel for containing the oxidiser and means for conveying the exhaust gas of the turbine to the second pressure vessel so as to be in heat exchange relation with the oxidiser in the second pressure vessel, thereby to convert any oxidiser in liquid form to the gaseous state and to pressurise gaseous oxidiser to a high pressure.

The invention will now be illustrated by means of the accompanying diagrammatic drawings in which:—

Fig. 1 illustrates a first embodiment of a plant according to the invention;

Fig. 2 illustrates a second embodiment of a plant according to the invention.

[6*d*.]

Referring to Fig. 1, a turbine 1 runs coaxially of a blower 2 supplying atmospheric air to an intermittent combustion chamber 3. Fuel is contained in a pressure vessel 4 and is supplied through a line 5 to aerodynamic valves 7, 8 respectively, the air for combustion being supplied to these valves through line 6. The combustion gases are supplied to the turbine 1 through lines 9. After their energy has been converted into work, the wate gases from the combustion process depart from the turbine, through a line 11, to a heat exchanger 10 and yield their heat therein to the fuel contained in the pressure vessel 4 associated with the heat exchanger 10, then depart to atmosphere through an exhaust 12.

The liquid fuel in the vessel 4 is heated until it is converted into a combustible gas and is at a high pressure, at which the combustible gas flows through the line 5 into the aerodynamic valves 7, 8.

In the plant comprising the second embodiment shown in Fig. 2 like parts to those in Fig. 1 have like references. This particular plant is suitable for use as a gas turbine drive in rockets, submarines and installations where air must not enter into the combustion, but is permissible as a carrier or diluent gas. In the plant of Fig. 2 the oxygen for combustion with the gasified fuel comes from an oxidising agent from a second pressure vessel 13. Although a blower 2 is connected to the combustion chamber 3 the oxygen in the air from this blower does not enter into the combustion because the oxygen for combustion comes from the oxidising agent. This oxidising agent is supplied through a line 14 to the intermittent combustion chamber 3, in addition to the fuel, which is supplied from the pressure vessel 4 through the valves 7, 8. Another heat exchanger 10 supplied with the turbine waste gases through the line 11 is associated with the pressure vessel 13.

WHAT WE CLAIM IS:—

1. A gas turbine plant of the intermittent combustion type in which a combustible gas is produced from a liquid fuel, said plant comprising a gas turbine, an intermittent combustion chamber preceding said turbine and in which the combustible gas and oxygen are burnt, a first pressure vessel preceding said combustion chamber for containing fuel and means for conveying the exhaust gas of the turbine to the first pressure vessel so as to be in heat exchange relation with the fuel in the first pressure vessel thereby to convert any fuel in liquid form to the combustible gas and to pressurise the combustible gas to a high pressure.

2. A gas turbine plant as claimed in Claim 1 in which means are provided for feeding an oxidiser to the intermittent combustion chamber with the fuel and air.

3. A gas turbine as claimed in Claim 2 in which the oxidiser feeding means include a second pressure vessel for containing the oxidiser and means for conveying the exhaust gas of the turbine to the second pressure vessel so as to be in heat exchange relation with the oxidiser in the second pressure vessel thereby to convert any oxidiser in liquid form to the gaseous state and to pressurise gaseous oxidiser to a high pressure.

4. A gas turbine plant substantially as hereinbefore described and illustrated in Fig. 1 or Fig. 2 of the accompanying drawings.

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1048448 COMPLETE SPECIFICATION
1 SHEET This drawing is a reproduction of the Original on a reduced scale

FIG.1.

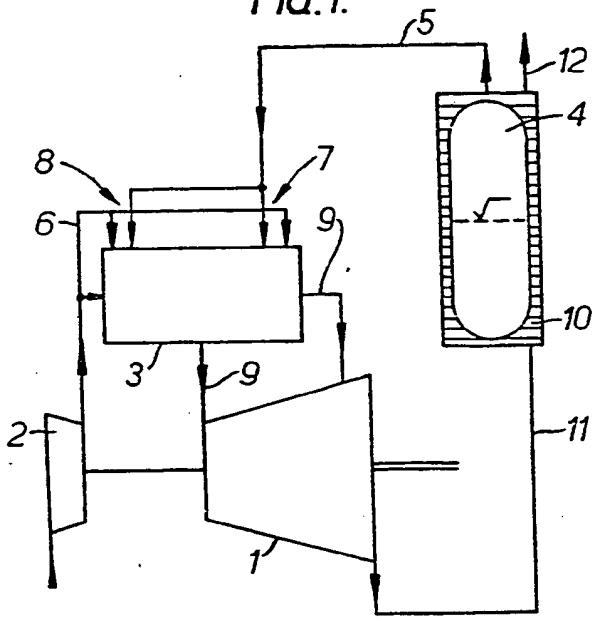

FIG.2.